

## Claims

What is claimed is:

1. A reaction mixture for synthesizing polyol monoesters and polyol diesters comprising at least one phase transfer catalyst, at least one triglyceride, at least one base initiator, and at least one polyol.
2. The reaction mixture of claim 1, wherein the phase transfer catalyst is a quaternary ammonium salt, a quaternary phosphonium salt, a polyethylene glycol, a polyethylene glycol ether, a polyethylene glycol ester, a crown ether, a hexaalkyl guanidinium salt, TDA-1, a lariat ether, a tertiary amine, any of the above compounds bound to a polymer, a derivative thereof or a mixture of two or more thereof.
3. The reaction mixture of claim 1, wherein the phase transfer catalyst is a compound of the formula  $\text{RAR}'_3^+ \text{X}^-$ ; a compound of the formula  $\text{R}''-(\text{OCH}_2\text{CH}_2)_n \text{OR}'''$ ; or a mixture thereof; wherein A is nitrogen or phosphorous, R is a straight chain  $\text{C}_1\text{-C}_{18}$  hydrocarbon, each  $\text{R}'$  is individually a straight chain  $\text{C}_1\text{-C}_{18}$  hydrocarbon, X is chloride, bromide, iodide, hydrogen sulfate, methyl sulfate or sulfate,  $\text{R}''$  and  $\text{R}'''$  individually are hydrogen, an alkyl group of from about 1 to about 24 carbon atoms, or an esterified carboxylic acid, and n is from about 2 to about 150.
4. The reaction mixture of claim 1, wherein the phase transfer catalyst is a salt of methyl tricaprylammonium or methyl tridodecyl ammonium.
5. The reaction mixture of claim 1, wherein the phase transfer catalyst is a polyethylene glycol of the formula  $\text{R}''-(\text{OCH}_2\text{CH}_2)_n \text{OR}'''$  wherein  $\text{R}''$  and  $\text{R}'''$  individually are hydrogen, an alkyl group of from about 1 to about 18 carbon atoms, and n is from about 4 to about 50.
6. The reaction mixture of claim 1, wherein the triglyceride is derived from vegetable oil or animal fat.
7. The reaction mixture of claim 1, wherein the base initiator is a metal carbonate, a hydroxide, an oxide, an alkoxide, or a mixture of two or more thereof.

8. The reaction mixture of claim 1, wherein the base initiator is  $M^+B^-$  wherein M is sodium, potassium, calcium or magnesium and B is hydroxide, carbonate, oxide or methoxide.
9. The reaction mixture of claim 1, wherein the polyol is an aliphatic compound having 2 to 12 free hydroxyl groups, an aromatic compound having 2 to 12 free hydroxyl groups, or a mixture thereof.
10. The reaction mixture of claim 1, wherein the polyol is glycerol, propylene glycol, ethylene glycol, or a mixture of two or more thereof.
11. The reaction mixture of claim 1, wherein the molar ratio of the polyol to the triglyceride is in the range of about 2:1 to about 10:1.
12. A method for synthesizing polyol monoesters and polyol diesters comprising  
mixing at least one phase transfer catalyst, at least one triglyceride, at least one base initiator, and at least one polyol to produce the polyol monoesters and polyol diesters.
13. The method of claim 12, comprising mixing at least one phase transfer catalyst, at least one triglyceride, at least one base initiator, and at least one polyol; and  
heating the resulting mixture to produce the polyol monoesters and polyol diesters.
14. The method of claim 12, comprising mixing at least one phase transfer catalyst, at least one triglyceride, at least one base initiator, and at least one polyol; and  
heating and stirring the resulting mixture to produce the polyol monoesters and polyol diesters.
15. The method of claim 12, wherein the phase transfer catalyst is a quaternary ammonium salt, a quaternary phosphonium salt, a polyethylene glycol, a polyethylene glycol ether, a polyethylene glycol ester, a crown ether, a hexaalkyl guanidinium salt, TDA-1, a lariat ether, a tertiary amine, any of the above compounds bound to a polymer, a derivative thereof or a mixture of two or more thereof.

16. The method of claim 12, wherein the phase transfer catalyst is a compound of the formula  $\text{RAR}'_3{}^+ \text{X}^-$ ; a compound of the formula  $\text{R}''-(\text{OCH}_2\text{CH}_2)_n \text{OR}'''$ ; or a mixture thereof; wherein A is nitrogen or phosphorous, R is a straight chain  $\text{C}_1\text{-C}_{18}$  hydrocarbon, each R' is individually a straight chain  $\text{C}_1\text{-C}_{18}$  hydrocarbon, X is chloride, bromide, iodide, hydrogen sulfate, methyl sulfate or sulfate, R'' and R''' individually are hydrogen, an alkyl group of from about 1 to about 24 carbon atoms, or an esterified carboxylic acid, and n is from about 2 to about 150.

17. The method of claim 12, wherein the phase transfer catalyst is a salt of methyl tricaprylammonium or methyl tridodecyl ammonium.

18. The method of claim 12, wherein the phase transfer catalyst is a polyethylene glycol of the formula  $\text{R}''-(\text{OCH}_2\text{CH}_2)_n \text{OR}'''$  wherein R'' and R''' individually are hydrogen, an alkyl group of from about 1 to about 18 carbon atoms, and n is from about 4 to about 50.

19. The method of claim 12, wherein the triglyceride is derived from vegetable oil or animal fat.

20. The method of claim 12, wherein the base initiator is a metal carbonate, a hydroxide, an oxide, an alkoxide, or a mixture of two or more thereof.

21. The method of claim 12, wherein the base initiator is  $\text{M}^+\text{B}^-$  wherein M is sodium, potassium, calcium or magnesium and B is hydroxide, carbonate, oxide or methoxide.

22. The method of claim 12, wherein the polyol is an aliphatic compound having 2 to 12 free hydroxyl groups, an aromatic compound having 2 to 12 free hydroxyl groups, or a mixture thereof.

23. The method of claim 12, wherein the polyol is glycerol, propylene glycol, ethylene glycol, or a mixture of two or more thereof.

24. The method of claim 13, comprising heating the mixture at a temperature less than or equal to about  $260^\circ\text{C}$  to produce the polyol monoesters and polyol diesters.

25. The method of claim 24, comprising heating the mixture at a temperature less than or equal to about 200°C to produce the polyol monoesters and polyol diesters.

26. The method of claim 14, wherein the molar ratio of the polyol to the triglyceride is in the range of about 2:1 to about 10:1.

27. The method of claim 14, wherein the polyol monoester is a polyol fatty acid monoester and the polyol diester is a polyol fatty acid diester.